



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. | | | | | | | | | | | | |
|--|---------------|-------------------------|--|------------------|----------|--|-------------|--|----------|--------------|------|--|-----------|---------------|------------|-------|
| 10/735,160 | 12/12/2003 | Sridhar Balasubramanian | 03-1840 | 1647 | | | | | | | | | | | | |
| 7590 LSI Logic Corporation Legal Department - IP 1621 Barber Lane, MS D-106 Milpitas, CA 95035 | | 12/18/2007 | <table border="1"><tr><td colspan="2">EXAMINER</td></tr><tr><td colspan="2">GU, SHAWN X</td></tr><tr><td>ART UNIT</td><td>PAPER NUMBER</td></tr><tr><td>2189</td><td></td></tr><tr><td>MAIL DATE</td><td>DELIVERY MODE</td></tr><tr><td>12/18/2007</td><td>PAPER</td></tr></table> | | EXAMINER | | GU, SHAWN X | | ART UNIT | PAPER NUMBER | 2189 | | MAIL DATE | DELIVERY MODE | 12/18/2007 | PAPER |
| EXAMINER | | | | | | | | | | | | | | | | |
| GU, SHAWN X | | | | | | | | | | | | | | | | |
| ART UNIT | PAPER NUMBER | | | | | | | | | | | | | | | |
| 2189 | | | | | | | | | | | | | | | | |
| MAIL DATE | DELIVERY MODE | | | | | | | | | | | | | | | |
| 12/18/2007 | PAPER | | | | | | | | | | | | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/735,160

Applicant(s)

BALASUBRAMANIAN, SRIDHAR

Examiner

Shawn X. Gu

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-12,15-17 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-12,15-17 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This final Office action is in response to the amendment filed 10 October 2007. Claims 1, 4-12, 15-17 and 21-24 are pending. Claims 2, 3, 13, 14 and 18-20 are cancelled. All objections and rejections not repeated below are withdrawn.

The amendment to the claims filed on 10 October 2007 does not comply with the requirements of 37 CFR 1.121(c) because the subject matter "a memory" has been deleted from claim 12 without showing appropriate markings such as a strike-through. Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Per claims 23 and 24, the limitation "the RAID controller" lacks sufficient antecedent basis. Claims 1 and 12 also recite "RAID storage controller" and "a first RAID storage controller". It is unclear which of the two is referred by "the RAID controller" in claims 23 and 24. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-12, 15, 16, 23 and 24 are rejected under U.S.C. 103(a) as being unpatentable over Reed et al. [5,845,095] (hereinafter "Reed"), in further view of Bell [5,410,707] (hereinafter "Bell"), Huang et al. [US 6,718,274] (hereinafter "Huang"), Green et al. [2003/0167380 A1] (hereinafter "Green"), Coombs [US 2003/0177149 A1] (hereinafter "Coombs"), Corrington et al. [6076142] (hereinafter "Corrington") and Applicant Admitted Prior Art (hereinafter "APA").

Per claims 1 and 12, Reed teaches a storage controller that is coupled between a computer system, which is external to the storage controller, the storage controller comprising:

a memory (controller NVRAM 220, see Fig. 2, or the memory device holding the controller configuration information, from which the information is transferred to the CBU, see Reed, col. 8, lines 39-45);

receiving means for receiving backup parameters from the computer system (see Reed, col. 4, lines 11-49, the backup parameters are received from the CBUs 226 after controller replacement; also see col. 9, lines 25-44, the NVM receives the controller configuration information pages);

the backup parameters, set by an operator of the computer system, defining how a backup operation will be executed (see Reed, col. 4, lines 5-10, organizing controller configuration information into page format before backup, thereby defining the backup operation to be performed by storing the data in page format; also see col. 10, lines 31-42);

invoking means for invoking a backup operation using the backup parameters (see Reed, col. 6, lines 28-30, storing/backup of the controller configuration information can be invoked by an updated command entered by the user which updates the network address; also see col. 11, claim 1, the controller backs up the controller configuration information in response to the creation of controller configuration information pages; furthermore the backup device is a memory and the controller is a processor, see col. 9, lines 42-44); and

responsive to a give event (copy controller configuration information into CBU when controller's address is modified by a system user, see Reed, col. 6, lines 28-30):

executing means for executing the backup operation to copy configuration information from the memory to a memory module (see Reed, col. 8, lines 35-45).

Reed does not teach that the memory module is a removable non-volatile memory module, but instead it is only disclosed as a random access memory (see Reed, lines 35-36). However, Reed teaches that a non-volatile memory module is used to store the controller configuration information for persistent storage in the event of a power loss (see Reed, col. 3, lines 35-67). Bell further teaches using a removable non-volatile memory to store controller configuration information (see Bell, col. 4, lines 9-28, detachable flash memory card) to provide increased mobility and flexibility. For instance, it is clear that a flash memory card taught by Bell is replaced and transported much more easily than an integrated memory module or a DRAM module connected to a slot. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the Applicant's invention to combine the teachings of Reed and Bell in order to provided increased mobility and flexibility for storing controller configuration information. APA also teaches the above feature in the Applicant's specification, page 1, lines 18-19. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the Applicant's invention to combine the teachings of Reed and APA in order to provided increased mobility and flexibility for storing controller configuration information.

Bell further teaches a Personal Computer Memory Card International Association (PCMCIA) slot (see Bell, Col. 4, Ln. 35-43), but does not teach determining means for determining if the removable non-volatile memory module is inserted in the PCMCIA slot, and responsive to a positive determination, executing the above backup operation. However, Huang teaches detecting the presence of a flash memory module on a PCMCIA slot and perform certain operations with the memory module if it is connected

(see Huang, col. 6, lines 43-67 and col. 8, lines 27-45), and the detection logic can be utilized manually whenever its function is required (see col. 8, lines 4-27). It is clear that determining the presence of a memory module when a write to the module is required avoids wasting execution time and system resources such as data bus if the target memory module is not present. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to combine the teachings of Reed, Bell and Huang in order to avoid wasting execution time and system resources.

Reed in further view of Bell and Huang does not teach the backup parameters are set by an operator via interface software that is executed by the computer system. However, Coombs teaches setting backup parameters through interface software by a user/operator (see Coombs, page 3, paragraphs [0029]-[0032]). It is clear that providing a software interface to allow users setting backup parameters increases the level of human control over a computing/storage system and more flexibility as opposed to only letting preprogrammed software to set backup parameters, and it would have been obvious to one ordinarily skilled in the art to combine Reed and Coombs for these reasons.

Reed in further view of Bell, Huang and Coombs does not teach a RAID storage controller and RAID disks controlled by the RAID storage controller, the receiving means for receiving backup parameters from the computer system receives via storage system software that is executed by the RAID storage controller, the RAID storage controller executing boot menu software that is used by the operator to set parameters

for the RAID storage controller's operation. APA teaches a RAID controller and RAID disks controlled by the RAID storage controller, as well as storing RAID controller information into a flash memory for backup (see Applicant's specification, page 1, lines 10-25). APA further teaches when a RAID controller fails, there is a need to replace it with a second RAID controller. Since Reed already teaches replacing a failed storage controller with a second storage controller and transferring configuration information of the failed storage controller to the second storage controller in order to simplify re-initialization and to reduce system downtime caused by the delay in replacing the failed storage controller, it would have been obvious to one ordinarily skilled in the art to use the teaching in Reed to implement RAID controller replacement in APA for the above reasons. The combination of Reed, Bell, Huang, Coombs and APA further teaches allowing a user to set parameters to a storage controller (see Coombs, page 3, paragraphs [0029]-[0032]). Corrington additionally teaches allowing a user to set parameters in a RAID controller by using a software interface executed by a RAID controller to provide flexibility (see Corrington, Abstract and col. 2, lines 10-26). Therefore, it would have been further obvious to one ordinarily skilled in the art to combine the teachings of Reed, Bell, Huang, Coombs, APA and Corrington to provide flexibility. Although the combined teaching of Reed, Bell, Huang, Coombs, APA and Corrington does not teach setting parameters by an operator is performed through a boot menu executed by the RAID storage controller, it teaches the parameters are set by an operator through a software interface. It is further clear to one ordinarily skilled in the art that setting parameters for system operation when the system first becomes

operational (during bootup) allows a chance for the user to configure the system based on the operator's preferences at the earliest opportunity, thereby avoiding or reducing the chance for the system to function in a way undesirable to the operator. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the Applicant's invention to provide the operator an opportunity to set parameters when the system boots up in order to configure the system to operate according to the operator's preferences at the earliest opportunity, thereby avoiding or reducing the chance for the system to behave in an undesirable way according to the operator's preference. If this is implemented then software interface taught by Reed in further view of Bell, Huang, Coombs, APA and Corrington becomes a boot menu executed by a RAID controller.

Although Reed in further view of Bell, Huang, Coombs, Corrington and APA does not teach the determining of insertion and executing the backup operation are responsive to the operator entering a command through one of the interface software and the boot menu console software, Green teaches a backup command entered by an operator through one of interface software and a boot menu console (see Green, Fig. 20) in order to backup data based on user demand instead of software control logic. Therefore, it would have been obvious to combine the teachings of Reed, Bell, Huang, Coombs, Corrington, APA and Green, in order to provide greater flexibility and easy of use, as well as retaining human control over the backup process so that human users can also request backups by bypassing software control.

It is also clear that claim 12's storage controller performs the method of claim 1.

Per claim 4, Reed further teaches responsive to a restore event, restoring the configuration information from the removable non-volatile memory module to the first storage controller (see Reed, col. 8, lines 43-48, controller 214 or 218 ... receive the controller configuration information page from the first random access memory/CBU).

Per claims 5 and 9, the restore event in Reed could be done automatically or manually. However, Reed teaches an interface software (see col. 6, lines 28-30, system user modifying controller's network address) and a boot menu console (see Reed, col. 3, lines 10-15, a network management system must have a boot menu console), and in most computer management systems or operating system the user is provided a command to restore data. Assuming Reed's restore is performed automatically without user intervention, then it is clear that one advantage of enabling a system administrator/user to enter a command to initiate the restore operation is that human control is retained and greater flexibility and easy of use are provided when combined with automatic restore. Green teaches a restore command entered by an operator through one of interface software and a boot menu console (see Green, Fig. 24) in order to restore data that was previously backed up. Therefore, it would have been obvious to combine the teachings of Reed, Bell, Huang and Green, in order to provide greater flexibility and easy of use, as well as retaining human control over the restore process.

Per claims 6 and 7, Reed further teaches disconnecting the removable non-volatile memory module from the first storage controller and connecting the removable non-volatile memory module to a second storage controller (see Reed, col. 3, lines 60-65, removing the first controller and replacing it with a second controller).

Per claim 8, Reed further teaches responsive to a restore event, restoring the configuration information from the removable non-volatile memory module to the second RAID storage controller (see Reed, col. 3, lines 11-34 and col. 8, lines 43-48, the event is any hardware change or software command, or an combination of the two that led to the restore operation; also see the rejection of claim 1 above for "the second RAID storage controller").

Per claim 10, Reed further teaches determining whether the configuration information is compatible with the second storage controller (see Reed, col. 4, lines 45-67, error detection using checksum algorithm); and

responsive to the configuration information not being compatible with the second storage controller, notifying an operator of incompatible configuration information (see Reed, col. 5, lines 13-21, the mechanism that replaces missing pages).

Per claims 11 and 15, Reed further teaches the configuration includes at least one of configuration data, firmware, bootware image, and component summary data (see Reed, col. 3, lines 63-67). APA further teaches this feature (see Applicant's specification, page 1, lines 16-17).

Per claim 16, the combined teaching of Reed and Bell further discloses the removable non-volatile memory module is a flash memory module (see Bell, col. 4, lines 9-28). APA further teaches this feature (see Applicant's specification, page 1, lines 17-19).

Per claims 23 and 24, the combined teaching of Reed, Bell, Huang, Green, Coombs, Corrington and APA teaches the second RAID storage controller provides redundancy to the RAID controller (see APA, page 2 of the Applicant's specification, lines 20-25), but fails to teach the RAID storage controller and the second RAID storage controller are housed in the same enclosure. However, it is clear to one ordinarily skilled in the art that housing a computing system in an enclosure provides certain levels of protection from physical damage, and housing components of a computing system in the same enclosure provides ease of transportation and storage shelving, and it further reduces the number of power source modules and heat venting parts required as opposed to housing the components of a computing system in separate enclosures. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the Applicant's invention to house the RAID storage controller and the second RAID

storage controller in the same enclosure to provide protection, ease of transportation and storage shelving, and to reduce the number of power source modules and heat venting parts required.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed, Bell, Huang, Green, Coombs, Corrington and APA, in further view of Ban [5,404,485] (hereinafter "Ban").

Per claim 17, the combined teaching of Reed, Bell, Huang, Green, Coombs, Corrington and APA does not specifically teach that the flash memory module has a flash file system format for storing data. However, Ban teaches a flash memory module that uses a flash file system format (Col. 1, Ln. 5-10) for providing compatible data management with existing operating systems (Col. 1, Ln. 29-49). Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the Applicant's invention to combine Ban's teaching with the combined teaching of Reed, Bell, Huang, Coombs, APA, Corrington and Green in order to provide compatible data management on the flash memory by implementing a flash file system.

7. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed, Bell, Huang, Green, Coombs, Corrington and APA, in further view of Klotz et al. [US 7,114,106 B2] (hereinafter "Klotz").

Per claims 21 and 22, the combined teaching of Reed, Bell, Huang, Green, Coombs, Corrington and APA does not teach the RAID storage controller is connected to the computer system using an Ethernet link. However, Reed teaches a data communication network and APA teaches RAID storage controllers. Klotz further teaches a networked attached storage device comprising RAID disks and a RAID controller, the controller interfaced/connected to a host through an Ethernet link (see Klotz, col. 23, lines 20-30), in order to provide networked storage and remote data accessibility to data requesters that are not in close physical proximity to the data storage. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the Applicant's invention to combine the teachings of Reed, Bell, Huang, Green, Coombs, Corrington, APA and Klotz in order to provide networked storage and remote data accessibility to data requesters that are not in close physical proximity to the data storage.

Response to Arguments

8. Applicant's arguments with respect to claims 1, 4-12, 15-17 and 21-24 have been considered but are not persuasive. The newly amendment limitations are taught by Reed, Bell, Huang, Green, Coombs, Corrington, Ban, Klotz and Applicant Admitted Prior Art as set forth above. The applicant's argument appears to state only that the combined teaching of the cited prior art does not disclosure or suggest the newly added limitations in the amended claims, hence no further response to the argument is

Application/Control Number:
10/735,160
Art Unit: 2189

Page 14

necessary as rejections of the newly added limitations have been described as set forth above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shawn Gu whose telephone number is (571) 272-0703. The examiner can normally be reached on 9am-5pm, Monday through Friday.

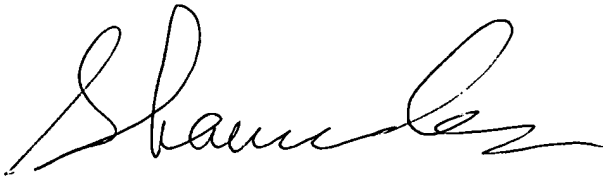
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on (571) 272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications


Application/Control Number:
10/735,160
Art Unit: 2189

Page 16

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shawn X Gu
Assistant Examiner
Art Unit 2189



HYUNG S. SOUGH
SUPERVISORY PATENT EXAMINER

12/14/07

11 December 2007